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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Serge Doucet

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EXAMINER

GOLUB, MARCIA A

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/665,138	Applicant(s) DOUCET ET AL.	
	Examiner MARCIA A. GOLUB	Art Unit 2828	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 May 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15, 17-37, 39, 40, 44, 45, 49, 50, 53-55, 57, 58, 60, 61, 63 and 64 is/are pending in the application.
- 4a) Of the above claim(s) 4, 5, 10-14, 23-27, 35 and 36 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 6-9, 15, 17-22, 28-34, 37, 39, 40, 44, 45, 49, 50, 53-55, 57, 58, 60, 61, 63 and 64 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

Applicant's arguments filed 5/21/08 have been fully considered but are moot in view of new grounds of rejection.

Claim Rejections - 35 USC § 102/103

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102(b) and 103(a) that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-3, 6-9, 15, 17-20, 22, 28-34, 37, 50, 60, 63 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Pan et al. (5,910,962) hereinafter Ref 1 and further in view of Town et al. ("Dual wavelength mode-locked fiber laser"), hereinafter Ref 2 and Town et al. ("Wide-band fabry-perot like filters in optical fiber" found in IDS), hereinafter Ref 3.

Regarding **claims 1, 2, 22 and 32**, Fig 3a of Ref 1 discloses a multi-wavelength laser source comprising:

- a) a pump laser unit [30a] adapted for generating an energy signal;
- b) a gain section including a homogeneously broadened gain medium comprising rare-earth doped fiber [5/4-6] having an superstructure grating [4 sets of gratings],
said superstructure grating forming a plurality of cavities [22A-22D] that are distributed in said homogeneously broadened gain medium such that,
when the energy signal [λ_p] is applied to said gain section, different resonant wavelengths [λ_1 - λ_4] resonate in respective ones of said cavities that are separated from one another,

the pump laser unit [30a] being adapted for applying the energy signal to said gain section to cause a multi-wavelength laser signal to be generated; [Fig. 4]

c) an output [19] for emitting the multi-wavelength laser signal; (Applicant's disclosure describes the device of Ref 1 in ¶ 0032 of the PGPub)

Ref 1 does not specify whether or not the optical fiber is homogeneously broadened. However, according to applicant's explanations filed earlier, there are two types of fibers: inhomogeneously broadened fibers are used in Raman-type fiber lasers and homogeneously broadened fibers are used in regular fiber laser. Since Ref 1 does not disclose the laser to be a Raman-type laser, therefore fiber is homogeneously broadened.

If the applicant disagrees with this statement then Ref 2 discloses a homogeneously broadened gain medium that is used in dual wavelength output fiber laser.

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of Ref 2 into the device of Ref 1 by using homogeneously broadened fiber as a gain medium, since the limitations of the homogeneously broadened fiber that prevent multi-wavelength lasing in a single cavity is not a concern to the laser with multiple cavities that are separated from each other.

Ref 1 does not refer to the grating pairs as superstructure gratings, however, since no definition of superstructure grating is provided in the claim the gratings pairs disclosed in the Ref 1 can be considered to form superstructure grating.

If the applicant disagrees with this statement then Ref 2 discloses a superstructure grating (comb filter) formed by superimposing two chirped gratings over each other with a slight shift, it is inherent that two grating (18 mm long, 2nd ¶ of 2nd col.) superimposed on each other with a slight shift (4 mm) written in a erbium doped optical fiber would form a plurality of separate cavities resonating at different wavelength when pumped by an energy signal.

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of Ref 2 into the device of Ref 1 by using superimposed chirped gratings instead of grating pairs for at least the purpose of

producing a compact multi-wavelength laser. Ref 1 expresses concern with making a compact laser in col. 5 l. 55-57.

Regarding **claims 3, 6-9, 15, 17-20, 28-31, 33, 34, 37, 50, 60, 63**, Refs 1 and 2 further disclose:

- 3, 37. “wherein the gain section further comprises an amplifying section; [20a]
- 15. “wherein the gain medium is selected from the set consisting of erbium-doped glass; [5/4-6]
- 17. “wherein said gain section includes an optical waveguide [optical fiber] ;
- 18. “wherein the optical waveguide includes an optical fiber;
- 19. “wherein said optical waveguide includes a waveguide core and a waveguide cladding; [inherent characteristics of optical fiber waveguide]
- 20. “wherein the superstructure grating is located in the waveguide core; (2/34-37)
- 28. “An optical transmitter apparatus comprising the multi-wavelength laser source described in claim 1.” Intended use of the device recited in the pre-amble that does not result in a structural difference of the device does not distinguish the invention over prior art. (*see MPEP 2111.03*)
- 29. “A device suitable for providing optical components characterization comprising the multi-wavelength laser source described in claim 1. (*see MPEP 2111.03*)
- 30. “A device suitable for providing temporal spectroscopy functionality comprising the multi-wavelength laser source described in claim 1 (*see MPEP 2111.03*)
- 31. “A device suitable for providing material characterization for non-linear effects comprising the multi-wavelength laser source described in claim 1 (*see MPEP 2111.03*)
- 33. “wherein the pump laser unit [30a] is positioned such as to generate the energy signal in a co-propagation relationship with the output;
- 34. “wherein the pump laser unit [33a] is positioned such as to generate the energy signal in a counter-propagation relationship with the output;

Second paragraph, column 2 on page 1459 of Ref 2 discloses:

- 6. “wherein the superstructure grating comprises: a) a first grating segment; b) a second grating segment superposed at least in part on said first grating segment;
- 7. “wherein the first grating segment is a chirped Bragg grating;

8. “wherein the second grating segment is a chirped Bragg grating;

9. “wherein the first grating segment and the second grating segment are substantially similar to one another.”

57,60,63. “wherein each of said cavities has a length in a millimeter order of magnitude.” This limitation is inherent to the structure for two reasons: 1st, because plurality of cavities are formed in the overlapping gratings of 18 mm long and 2nd, because any length can be measured in millimeters.

Claims 39, 40, 44, 45, 49, 50 and 53-55 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ref 1 and Ref 2 as applied to claims 1, 22 and 32 above.

Ref 1 and Ref 2 disclose a multi-wavelength laser source as described above, but do not disclose:

39,44,49. “wherein the multi-wavelength signal is characterized by at least 8 laser wavelengths”

40,45,50. “wherein the multi-wavelength signal is characterized by at least 15 laser wavelengths”

53-55. “wherein at least five of said cavities are separated from one another”

The device of Ref 1 is characterized by 4 cavities and 4 wavelengths. However, Ref 1 discloses in col. 5 l. 29-31 that other numbers of lasers may be connected in series and therefore larger number of wavelengths can be produced.

It would have been obvious to one of ordinary skill in the art at the time of the invention to connect a desired number of lasers in series to produce at least 8 or at least 15 laser wavelengths and to create at least 5 separate cavities for at least the purpose of obtaining a desired number of output wavelengths.

Claims 58, 61 and 63 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ref 1 and Ref 2 as applied to claims 1, 22 and 32 above.

Ref 1 and Ref 2 disclose a multi-wavelength laser source as described above:

“wherein said homogeneously broadened gain medium has a length, the multi-wavelength laser signal is characterized by a number of laser wavelengths”

but do not disclose verbatim:

“a ratio of the number of laser wavelengths to the length of said gain medium is

at least 1 laser wavelength per cm of the length of said gain medium.”

Ref 1 does not disclose the length of the gain medium. However, Ref 1 discloses that the size of the fiber laser should be minimized. Ref 1 also discloses producing 4 wavelengths output. Ref 2 discloses the length of the grating to be 18 mm. Therefore the incorporation of the superstructure grating structure into the fiber laser will produce almost 2 wavelengths per cm of gain medium. One of ordinary skill in the art would have been motivated to minimize the length of the gain medium while maximizing the number of output wavelengths for at least the purpose of producing compact multi-wavelengths output fiber laser suitable for optical communication.

Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ref 1 and Ref 2 as applied to claims 1, 22 and 32 above and further in view of Morin et al. (2004/0037505).

Ref 1 does not disclose:

21. “wherein the superstructure grating is located in the waveguide cladding”

However, Morin discloses writing the superstructure grating in the waveguide cladding (paragraph 0037)

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of Morin into the device of Ref 1 by writing the superstructure grating in the cladding for at least the purpose of avoiding cladding mode losses.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Contact Info

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MARCIA A. GOLUB whose telephone number is (571)272-8602. The examiner can normally be reached on M-F 9-6 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Minsun Harvey can be reached on 571-272-1835. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Marcia A. Golub/

/Minsun Harvey/

Supervisory Patent Examiner, Art Unit 2828